8410 **PATENT APPLICATION**

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Certificate of "Express Mail"

Filing Number : ET 169 626 361 US
Date of Deposit : April 26 2001

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METHOD AND APPARATUS FOR REMOTE PROCESSING AND SHARING OF DIGITAL IMAGES

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METHOD AND APPARATUS FOR REMOTE PROCESSING AND SHARING OF DIGITAL IMAGES

BACKGROUND OF THE INVENTION

Field Of the Invention

The present invention relates to the use of digital image acquisition devices. More specifically, it relates to a method and apparatus to enable the remote printing, storing or sharing of digital images.

Background Description

The introduction of digital cameras has expanded the possibilities for camera users. The users of the digital cameras have the ability to display and review images after acquisition and, subsequently, select those images that they want to retain. Digital images are easily transferred to a different storage device, which allows for ease of sharing and image manipulation. However, the present model for the use of digital cameras resembles more the model of a PC peripheral than the model for the use of photographic cameras. The images, after acquisition and selection, are stored in the local memory of the digital camera. Once all the available space in the memory is used for storage of the digital images, the images have to be transferred to another storage device such as a PC. The user is then practically tethered to a PC or must use removable memories, such as Compact Flash cards or floppy disks, in the camera and then transfer the images from the removable memories to the PC. If the user desires to obtain hard copy output from the digital

images or to share the images, the user must transfer to images to a location where hard copy output can be obtained or from which the images can be shared. The transfer of the images is effected either by physically transporting the removable memory to a location where hard copy output can be obtained or by transferring the images to a PC and, subsequently, uploading the images to a remote node of a communication network where hard copy output can be obtained or from which the images can be shared.

Several solutions have been proposed to enhance the capabilities of digital cameras. Hull et al., in U.S. Patent No. 5, 806,005 (Jonathan J. Hull, et al., U. S. Patent 5,806,005, Wireless Transfer From a Digital Still Video Camera to a Networked Computer, Sept. 8, 1998), disclose a digital camera with a cellular telephone transmitter. The Ricoh RDC-i700 digital camera allows the user to FTP upload images to a web site or e-mail images or to transfer images to a PC connected to a modem. A similar system, a digital camera with a modem, is disclosed by Van Ryzin (John M. Van Ryzin, WIPO Publication WO 00/48384, A System and Method for Transmitting and Receiving Digital Picture Images from a Digital camera to One or More Remote Locations, 17 August 2000). Steinberg, et al. (Eran Steinberg, et al., WIPO Publication WO 00/01138, Camera Network Communication Device, 6 January 2000) disclose a device for connecting a digital camera to a communication network for downloading data to a remote computer. If the device is incorporated into the camera, the resulting camera is the same as a camera with a modem.

In these solutions, if the camera user were located in a different telephone area code than the remote computer or server to which the user desires to download the images, the user would incur a toll charge. Depending on the rate structure and the time duration for the telephone call, the toll charge could be significant.

Other solutions are also costly and those costs have to borne by or passed back to the users of digital cameras who upload images via the infrastructure.

The users of digital cameras who desire to obtain hard copy output from the digital images or to share the images are not provided the opportunity to transmit the images to a remote node of a communication network through an automatically determined closest entry point.

SUMMARY OF THE INVENTION

It is the primary object of this invention to provide an apparatus and method that enables the users of digital image acquisition devices to obtain hard copy output from or to share the digital images by transmitting the images to a remote node of a communication network through an automatically determined closest entry point.

It is another object of this invention to enable the transmission of the images to the remote node of a communication network to occur at the fastest data rate.

It is also another object of this invention to enable the transmission of the images to be interrupted and restarted.

A further object of this invention is to enable the transmission of the images, after interruption and restart, to restart with the image datum immediately following the last image datum received at the remote node.

To achieve these and other objects, one aspect of the invention includes an apparatus for enabling the remote printing or storing or sharing, at a node in a data communications network, of digital images from an image data source provided by a customer and of identifying information, the identifying information stored in a storage component in the apparatus. The apparatus comprises means for accessing one image or a plurality of images from the image data source, means for

automatically determining a closest entry point into the data communications network, and means for transmitting the image or plurality of images and the customer identifying information, through the entry point, to a remote node of the network. The identifying information could be preset in the apparatus or, in another aspect of the invention, the apparatus further comprises means for receiving the identifying information.

Another aspect of this invention is a method of utilizing the means provided by the apparatus to print, store, or share, at a remote node in a data communications network, digital images from an image data source provided by a customer. Still another aspect of this invention is a method of utilizing the means provided by the apparatus to print, store, or share, at a remote node in a data communications network, digital images from an image data source provided by a customer wherein the transmission of an image or plurality of images from the apparatus to the remote node of the communication network comprises steps to ensure that the transmission occurs at the highest possible data rate.

A further aspect of this invention is a method of utilizing means provided by the apparatus to print, store, or share, at a remote node in a data communications network, digital images from an image data source provided by a customer wherein the transmission of an image or plurality of images from the apparatus to the remote node of the communication network comprises further steps to allow detecting an interruption and restarting transmission after the interruption.

Another aspect of this invention is a method of utilizing the means provided by the apparatus to print, store, or share, at a remote node in a data communications network, digital images from an image data source provided by a customer wherein the transmission of an image or plurality of images from the apparatus to the remote node of the communication network comprises further steps to synchronize a transmission event with the receiving node so that transmission can

remote node.

Still other aspects of this invention relate to databases for maintaining, at a remote location, image data provided by a customer and other data relating to the customer and for enabling the sharing of image products.

The method and systems of this invention allow the users of digital cameras to upload the digital images to a remote node of a communication network through an automatically determined closest entry point thereby being able to print, share or store the images from any location with access to a communication port (such as a telephone connection). The user of the digital camera does not need to connect the camera or the removable memory to a computer with appropriate drivers and transmit the images from the computer to the remote node of the communication network. Neither does the user of the digital camera need to incur excessive telephone toll charges in connecting to the network or pay for additional network infrastructure.

DESCRIPTION OF THE DRAWINGS

The novel features that are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with other objects and advantages thereof will be best understood from the following description of the illustrated embodiment when read in connection with the accompanying drawings wherein:

Fig. 1 depicts a graphical representation of an embodiment of the system that enables printing, storing, or sharing at a remote node in a data communications network, of digital images from an image data source provided by a customer;

Fig's. 2A, and 2B depict a flowchart of an embodiment of the method that enables printing, storing, or sharing at a remote node in a data communications network, of digital images from an image data source provided by a customer;

Fig. 3 depicts a block diagram of selected components of an embodiment of the apparatus of this invention for enabling the remote printing or storing, at a node in a data communications network, of digital images from an image data source provided by a customer;

Fig. 4 depicts a flowchart of an embodiment of the method that ensures that the transmission of image or plurality of images from the apparatus to the remote node of the communication network occurs at the highest possible data rate;

Fig. 5 depicts a flowchart of an embodiment of the method that enables detecting an interruption and restarting transmission after the interruption;

Fig. 6 depicts a flowchart of an embodiment of the method that enables the synchronization of a transmission event with the receiving node so that transmission can restart at the image datum immediately following the last datum received at the remote node;

Fig. 7 depicts a graphical representation of an embodiment of the server at the remote node of the network wherein the representation illustrates selected databases;

Fig. 8 illustrates the contents of an embodiment of the image database;

Fig. 9 illustrates the contents of an embodiment of the database that contains data related to the apparatus and the customer;

Fig. 10 illustrates the contents of another embodiment of the database that contains data related to the apparatus and the customer.

DETAILED DESCRIPTION

To enable consumers to obtain hard copy or digital copy output from or to share digital images by transmitting the images to a remote node of a communication network through an automatically determined closest entry point. A system and method are disclosed whereby the customer is provided with a specific apparatus, hereafter called a communications center, having identifying information stored in a memory therein, wherein one or more images and said the identifying information are transmitted to at a remote node of a communication network through an automatically determined closest entry point. The image or plurality of images have been accessed from the image data source and have been transferred from the image data source to the communication center. Other aspects of this invention that enable the transmission to occur at the highest possible data rate, enable detecting an interruption and restarting transmission after the interruption, and enable synchronizing a transmission event with the receiving node so that transmission can restart at the datum subsequent to the last datum received at the remote node are disclosed. Databases for maintaining, at a remote location, image data provided by a customer and other data relating to the customer and for enabling the sharing of image products are also disclosed.

The System and Method

Referring to Fig's. 1, 2A and 2B, a customer 10 utilizes an image acquisition device (not shown) to acquire images and stores the image data in a data source 1, such as the storage area of the image acquisition device or a storage medium such as a Compact flash card, Memory Stick, PCMCIA card or a floppy or CD-R disk (step **110**). The customer **10** is provided with a communication center **2** wherein the center has identifying information (step **100**). Customer related data can be entered

into a data structure (also not shown) located in a storage device (also not shown) at the remote node of the network **5** at the time that the customer **10** obtains the communication center **2** (step **105**). The image data is then transferred from to the communication center **2** (step **115**). The transfer of the image data from the data source **1** to the communication center **2** occurs when after it has been detected that the data source **1** is connected to the communication center **2**. A processor (not shown) in the communication center **2** executes program code (also not shown), in a well known manner, to transfer the image data from the data source **1** to the communication center **2**. The communication center **2** then executes operations to determine a closest entry point into the network **4** (step **118**). The operations used to determine the closest entry point will be fully explained below when the communication center **2** is described. The image in data is then transmitted to a remote node of a network via a communication link **3** through the closest entry point, such as a local ISP in the case where the network is the Internet (step **120**). As part of the operations of the communications center **2**, the image and identifying data is structured according to the required protocol for the network. The communication link **3** can be a wired link, such as a telephone line or a network line, or it could be a wireless link. Either as part of the customer related data entered into a data structure in step **105** or by means of entering data through the user interface controls (not shown) in the communication apparatus center **2**. The consumer indicates whether hard copy output, digital copy output or image sharing (or a combination of these options) is desired (step **125**). If hard copy is desired, the image data is sent to a photofinisher **6** where it is printed in a photo printer **7** (step **130**). It should be apparent that the photofinisher **6** and photo printer **7** can be located at the same location as the remote site server **5** or at a different node of the network. The hard copy is then provided to the customer or to recipients specified by the customer (step **135**). If digital copy is desired, the image data is placed in a removable storage medium **8** such as a recordable CD (CD-R or CD-RW), a ZIP ™ disk, or one or several floppy disks (step **140**). The digital copy is then provided to the customer or to recipients specified by the customer (step **145**). Additionally, the image data could be entered into an image database also not shown) and stored (step **150**). If image sharing is desired (step **155**), the image data is shared

with recipients **15** specified by the customer (step **160**).

The Communication Center

Referring to Fig. 3, selected components of an embodiment of the communication center **2** are shown in block form. It should be apparent to those skilled in the digital arts that a processor based system includes other components which are a well known part of a digital design such as components that provide information that can provide date and time information (such as a system clock). Processor **200** performs the operations to manage the accessing of one image or a plurality of images from the image data source **1**, manage the automatic determination of a closest entry point into the data communications network **4**, and manage the transmission of the image or plurality of images and the identifying information, through the entry point, to a remote node of the network **5**.

Unique identifying information is associated with each communication center **2**. The identifying information is stored in ROM or EPROM **230** or in other storage devices **250**, such as flash memory, in the communication center **2**. The identifying information can be preset in the center by means well known in the art. In the case of preset identifying information, the identifying information can be modified either by modifying the memory in the case of EPROMs or replacing the memory in the case of ROMs. Alternatively, the input/output port **260** provides means for receiving the identifying information. If the identifying information is loaded through the input/output port **260**, it is stored in non-volatile storage **250** such as flash memory. Input/output port **260** can be a serial port, a USB port or other input/output ports well known in the state of the art. The writing to storage occurs under control of the processor **200** by means well known in the art. Other uses of means of receiving identifying information are well known in the art (for example, setting information into cellular telephones). Identifying information can include an identifying number or address for the communications center as well as customer identifying information and information such as the date and time of transmission. The customer can interact

with the communications center **2** by means of the user interface controls **280** and user interface devices comprising an LCD **285**, a control panel **290** and a keypad **295**. It should be apparent that the communications center **2** can include some or all of the user interface devices as well as other user interface device well known in the art. The computer instructions for accessing the identifying information reside in either the ROM or EPROM **230** or the RAM **240** or other storage **250** such as a flash memory. The method for accessing information from memory is well known to those skilled in the art.

A storage device interface **210** or a digital acquisition device interface **215**, along with the required driver software (not shown) provide means for accessing one image or a plurality of images from the image data source **1**. One or both interfaces would be included in the communication center **2**. The driver software would be stored in the storage device **250,** such as flash memory, a disk drive, an EPROM or stored in RAM **240**. Other configurations will be apparent to those skilled in the art and these are to be included in the spirit of the present invention. The driver software could be installed during the assembly and setup of the communication center **2.** Alternatively, the methods described in commonly assigned U.S. Patent Application Serial No. 09/653,597, filed on August 31, 2000, entitled "Web Based File Upload System", hereby incorporated by reference herein, can be used to upload driver software and application software (or an "applet") to transfer the data from the image data source **1** to the communication center **2** or to the remote server **5**.

A network connection control and connection device module **220** implements means for transferring information to a network. The preferred embodiment of a connection device is a modem. However, other possible devices are an Ethernet adapter, a router, a hub, an infrared link or any wireless connection, depending on the network used and the mode of communicating to the network. It should be apparent that a modem could be a wireless modem. The network connection control interfaces between connection device (such as the modem) and

the processor **200**. The methods of accessing a network from a computer are well known to those skilled in the art.

In order to automatically determine the closest entry point into the data communications network **4**, the processor **200** can initiate a call though the network connection control **220A** and connection device (modem) **220B** to a toll free number which has been previously established. At the location of the toll free number (not shown), a computer (also not shown) performs operations to recognize the location of the communication center **2** through caller ID, to locate the closest entry point into the data communications network **4** from comparison of the location of the communication center **2** and a stored list of locations of entry points into the data communications network **4**, and to transmit back to the communication center **2** (through the connection device **220B**) the contact information (phone number or network address, for example) of the closest entry point into the data communications network **4**. In the configuration where the data communications network **4** is the Internet, the toll free telephone service would, in one embodiment, be provided by a national ISP service (AOL or ATT.net, for example). Alternatively, a GPS receiver and control module **225** could be used to ascertain the location of the communication center **2**. Comparing the location of the communication center **2** as determined from the GPS receiver to a stored list of locations of entry points into the data communications network (not shown) will provide the contact information (phone number or network address, for example) of the closest entry point into the data communications network 4. (The list of locations of entry points into the data communications network could be stored in ROM or EPROM **230** or in other storage **250** such as a flash memory.) Other means for automatically determining the closest entry point into the data communications network **4**, in addition to the ones described above, include comparing the location of the communication center **2** to a stored list of locations of entry points into the data communications network when the location of the communication center is known or accessing a preset (in ROM, EPROM or flash memory) contact information of the closest entry point into the data communications network when the location of the communication center is known.

The computer code for managing and implementing the process of receiving data comprising the contact information for the closest entry point into the data communications network resides in either the ROM or EPROM **230** or the RAM **240** or other storage **250** such as a flash memory. The methods for communicating between two computers or comparing items in memory are well known to those skilled in the art.

Upon automatically determining the closest entry point into the data communications network **4**, the image or plurality of images and the identifying information are transmitted to a remote node of the network through the entry point by means of the network connection device **220B** under control of the processor **200**. The computer code for establishing communication with the closest entry point into the data communications network and transferring the images and identifying information resides in either the ROM or EPROM **230** or the RAM **240** or other storage **250** such as a flash memory. The method for establishing communication between a computer and a point in a network is known to those skilled in the art.

In an alternate configuration in which the methods described in commonly assigned U.S. Patent Application Serial No. 09/653,597, filed on August 31, 2000, entitled "Web Based File Upload System", are used to upload driver software and application software (or an "applet"), upon automatically determining the closest entry point into the data communications network **4**, connection to a remote node of the network is established through the entry point. Then, driver software and application software (or an "applet") are loaded onto the communication center **2**. The application software manages and implements the transfer of the image or plurality of images and identifying information to a remote node of the network. Additionally, the methods described in commonly assigned U.S. Patent Application Serial No. 09/653,597 constitute an embodiment of means for installing operating files in the communication center **2**.

Methods for Efficient Reliable Transmission

The communications center **2** described above includes the processor **200** that can execute computer readable code to optimize or automate functions. The ability to automate functions allows for the development of methods for efficient and reliable transmission. Fig. 4 depicts a flowchart of an embodiment of the method that ensures that the transmission of one or more images from the communications center **2** to the remote node of the communication network **5** occurs at the highest possible data rate. The method starts with a predetermined packet size, Npacket, and a predetermined data rate, Data $rate_0$. An image file containing one image and identifying information (if any) is accessed by the processor **200** (step **310**) in the first step. The size of the image file is compared to the predetermined packet size, Npacket (step **320**). If the file size is smaller than or equal to the predetermined packet size, the packet size to be transmitted is the same as the file size (step **340**). If the file size is larger than the predetermined packet size, the file is divided into packets of size Npacket (step **330**). If necessary to ensure that the sum of packet sizes equals the file size, one packet of smaller size is formed (step **330**). The above steps constitute an embodiment of means for constructing at least one of a plurality of packets of data wherein the data in the at least one of a plurality of packets comprises the image data for at least one image and the identifying information. The first packet is transmitted at the predetermined data rate, Data $rate_0$ (step **350**). If the transmission is successful, the communication center **2** receives a confirmation of successful transmission from the remote node **5**. Upon positive determination of the success of the transmission (step **360**) (when the transmission is successful) the data rate is increased by a predetermined amount, Δ (step **370**), until a predetermined maximum data rate is reached. If the calculated data rate exceeds the maximum data rate, the data rate is set to the maximum data rate. The next packet is transmitted and the success of the transmission is determined (step **380**) and the process repeats until the maximum rate is reached or all the images are transmitted.

If the transmission is not successful, the data rate is decreased by the predetermined amount, Δ (step **390**). The next packet is transmitted and the success of the transmission is determined (step **380**). If the transmission is successful, transmission continues at the data rate determined in the previous step (step **395**). If the transmission is not successful, the data rate is decreased by the predetermined amount, Δ (step **390**). Steps **380** and **390** are repeated until successful transmission is achieved. It should be apparent that other embodiments of the above method can be implemented, for example, starting at the maximum data rate and reducing upon unsuccessful transmission or starting at a lowest data rate and increasing the data rate upon successful transmission. The computer readable code that details the above method resides in either the ROM or EPROM **230** or the RAM **240** or other storage **250** such as a flash memory or other computer readable medium. It should be apparent to one skilled in the art how to convert the flowchart to a detailed computer readable code.

Ensuring the reliability of transmission requires providing means to account for interrupting signals such as call interrupt, incoming calls. Fig. 5 depicts a flowchart of an embodiment of the method that enables detecting an interruption and restarting transmission after the interruption. The process starts with the detection of the presence of an interrupting signal during transfer of the at least one of a plurality of packets of data (step **400**). Means for identifying the presence of an interrupting signal during transfer of at least one of a plurality of packets of data generates a signal to the processor. The actual implementation of such means will differ for different connection devices **220** but is known to those skilled in the art.

Upon positive detection of the interrupting signal (step **410**), the transmission is interrupted (step **420**). The means for interrupting the transmission in one embodiment include means for instructing the network connection control module **220** to stop the transmission and means for determining the location in the packet of the last datum transmitted. Implementation of the above described means is well known to those skilled in the art. After a predetermined waiting period, transmission

re-establishment is attempted (step **430**).

Synchronizing the transmission with the data received at the remote server enables efficient re-transmission. Fig. 6 depicts a flowchart of an embodiment of the method that enables the synchronization of a transmission event with the receiving node so that transmission can restart at the datum immediately following the last datum received at the remote node. In the initial step, at the initiation of a transmission event, a "Ready to transmit" signal is sent to the remote site (step **500**). The server at the remote node **5** transmits back to the communications center **2** a packet identifier for the last packet received and the file size of last transmission (step **510**) from communications center **2**. (In this embodiment, the packet identifier and the file size of last transmission constitute synchronizing information.) The file size of the file received at the remote node during the last transmission is compared to the size of the file for the packet received during the last transmission (step **520**) where the comparison is executed by the processor **200** of the communications center **2**. If the file size of the file received at the remote node during the last transmission is smaller than the size of the file for the packet received during the last transmission, the remainder of that packet is transmitted (step **530**). If the file size of the file received at the remote node during the last transmission is equal to the size of the file for the packet received during the last transmission, the next packet is transmitted (step **540**). At the completion of transmission of all packets, a completed transmission indicator is transmitted to the server at the remote node **5**. This action will reset the indicators for packet identifier and the file size of last transmission for the specific communications center **2**. In this embodiment, the transmission event is synchronized with the information received at the remote node by the above described means. Synchronization between a transmitter and receiver is well known to those skilled in the art and other synchronization methods are known and these are to be included in the spirit of the present invention.

The computer readable code that details the above methods resides in either the ROM or EPROM **230** or the RAM **240** or other storage **250** such as a

flash memory or other computer readable medium. It should be apparent to one skilled in the art how to convert the flowcharts to a detailed computer code.

The term "computer-readable medium" as used herein refers to any medium that participates in providing instructions to processor **200** for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, optical or magnetic disks or flash EPROM, such as storage device **250**. Volatile media includes dynamic memory, such as RAM 240. Transmission media includes coaxial cables, copper wire and fiber optics, including the wires that comprise bus 702. Transmission media can also take the form of acoustic or electro-magnetic waves, such as those generated during radio-wave and infra-red data communications.

Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, a CDROM, any other optical medium, a RAM, a PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge, a carrier wave such as electromagnetic waves (such as used in cellular telephones) or electrical signals (such as those carried in telephone cables), or any other medium from which a computer can read.

Databases

Fig. 7 depicts a graphical representation of an embodiment of the server at the remote node of the network **5** wherein the representation illustrates selected databases. The server at the remote node of the network **5** is represented by a system **710** that includes the components that perform many of the server functions, such as a processor, volatile and non-volatile memory devices, communication modules, a clock, and a data storage device **720** that contains an communications center and customer data database **725**. Shown separately, but in communication with

the server at the remote node of the network **5**, is another data storage device **730** that contains an image database **735**. It should be apparent that data storage device **730** can, in one embodiment, be physically the same as data storage device **720** or physically connected to the system **710**. In another embodiment, data storage device **730** resides in a back-end server (not shown) in communication with the server at the remote node of the network **5**. The server at the remote node of the network **5** could also be in communication with another back-end server (also not shown) where billing and other transaction are processed. Such configurations are known to those skilled in the art.

Referring to Fig. 8, the image database **735** comprises the communications center identifier **810**, an image data item identifier **820**, the image data file **830**, the image acquisition device descriptor **840**, image processing preference descriptors **850**, and a list of the recipients of images or image products and the image products sent to each recipient **860**. In one embodiment, the communications center identifier **810** is included in the identifying information that resides in the communication center **2**. The image acquisition device descriptor **840** identifies the image acquisition device. Examples of image acquisition identifiers are manufacturer and model number for cameras or scanners. Once the device is identified, its characteristics can be obtained and a device profile can be constructed in the manner described in U.S. Patent No. 6,128, 415 (Hultgren, et al., Device Profiles for Use in a Digital Image Processing System, issued on Oct. 3, 2000), hereby incorporated by reference herein. Then, if hard copy is desired, the method described in U.S. Patent No. 5,694,484 (Cottrell, et al., System and Method for Automatically Processing Image Data to Provide Images of Optimal Perceptual Quality, issued on Dec. 2, 1997), hereby incorporated by reference herein, can be used to provide an image of optimal perceptual quality rendered by a hard copy output device of known characteristics.

The image processing preferences identified by the image processing preference descriptors **850** include cropping, red-eye removal, color shift, restoration

preferences and other processing preferences. The image products that can be sent to each recipient include prints, shared images, framed prints, items (coffee mugs, plates, etc.) with images transferred, clothing with images transferred, and other products containing images.

The image database **735** enables the re-sending of image products, the processing of images without loss of data, the optimal processing of images from the knowledge of the image acquisition device used and provides a record of disposition of images (list of the recipients of images) which the customer can access.

Referring to Fig. 9, the communications center and customer data database **725** includes the communications center identifier **810**, a customer identifier **940**, image product form preferences **920** corresponding to the identified customer, customer billing data **930**, and a list of candidate recipients of image products and an address for each recipient **950**. Customer billing data **930** can include credit card information and billing addresses. The customer can access this database using the customer identifier **940**. Access to the database **725** allows the customer to modify the image product form preferences **920**, customer billing data **930**, and a list of candidate recipients of image products and an address for each recipient **950**. The customer can access the item in the database **725** by accessing the remote node of the network **5** (a web site in one embodiment). Alternate means of accessing the database **725**, such as direct contact with a service organization, can be provided. The communications center identifier **810** used in conjunction with the customer identifier **940** provides a correspondence between the communications center **2** and the customer **10**. Note that since the identifying information can be modified in the communications center **2**, the correspondence between communications center **2** and customer **10** does not present a difficulty if the communications center is provided to a new customer.

Referring to Fig. 10, database **725** can further comprise a list of digital image acquisition device identifiers **960**. The list of digital image acquisition

device identifiers provides a list of devices to be profiled so that the method of U.S. Patent No. 6,128,415 and of U.S. Patent No. 5,694,484 can be applied to insure optimum quality hard copy.

A system and method to enable the customer to obtain hard copy or digital copy output from or to share or store the digital images by transmitting the images to a remote node of a communication network through an automatically determined closest entry point has been disclosed. Furthermore, methods that enable the transmission of the images to the remote node of a communication network to occur at the fastest data rate, enable the transmission of the images to be interrupted and restarted, and that enable the transmission of the images, after interruption and restart, to restart with datum immediately following the last datum received at the remote node have been disclosed. The databases needed to provide the information so that the disclosed system can provide the best service to the customer have also been disclosed.

Other embodiments of the invention, including combinations, additions, variations and other modifications of the disclosed embodiments will be obvious to those skilled in the art and are within the scope of the following claims.